What is claimed is:

1. A system of converting waste plastics into hydrocarbon oil comprising:

(1) a thermal cracking reactor, into which solid waste plastics are fed and in which said waste plastics are cracked at a temperature in a range of 270-800°C to obtain a thermal cracking resultant (product) of partly gaseous hydrocarbons and partly a mixture of liquid hydrocarbons and residues;

(2) a catalytic cracking portion coupled to receive said gaseous hydrocarbons, in which the gaseous hydrocarbons are cracked with an acidic catalyst;

(3) a cooling portion in which the gaseous hydrocarbons after the catalytic cracking are substantially converted into liquid hydrocarbons of smaller molecules, and remaining non-convertible gaseous hydrocarbon substances are transported back to compensate the heating of the thermal cracking reactor; and

(4) a continuous thermal cracking and residual discharging portion being connected to receive the liquid hydrocarbons and residues from said thermal cracking reactor, such that the liquid hydrocarbons are gradually and fully thermally cracked into gaseous hydrocarbons when passing through the continuous thermal cracking and residual discharging portion, while the dry residues from the previous thermal cracking and new residues generated from the further thermal cracking are discharged at a residual discharge outlet of the continuous thermal cracking and residual discharging portion.

2. The system of claim 1, further comprising a hydrochloride removal portion connected before the catalytic cracking portion to receive the gaseous hydrocarbons, respectively, from the thermal cracking reactor and from the continuous thermal cracking and residual discharging portion, in which the gaseous hydrocarbons are subject(ed) to reaction with an alkaline metathetic substance at a high temperature such that the resulting gaseous hydrocarbons are almost chlorine free; said catalytic cracking reactor being connected to said hydrochloride removal portion to receive the chlorine-free gaseous hydrocarbons and having said gaseous hydrocarbons subject(ed) to catalytic cracking with said acid catalyst. metallic?

relative substantially?

3. The system of claim 1, further comprising a pressurized activating reaction portion provided to receive said liquid hydrocarbons from the cooling portion to solidify few amount of sulfur, nitrogen, phosphorus contained in said liquid hydrocarbons so as to obtain purified hydrocarbon oils.

4. The system of claim 1, wherein said continuous thermal cracking and residual discharging portion comprises a plurality sets of reacting tubes parallel arranged with one another, in which screw conveyors are provided, each screw conveyer rotating in an opposite direction with the rotation of adjacent screw conveyors such that the mixture of liquid hydrocarbons and residues is pushed continuously forward from the beginning of the tubes to the end of the tubes, while the liquid hydrocarbons are fully gasified, and the residues are discharged from a residual discharging outlet.

5. The system of claim 2, wherein said hydrochloride removal action is carried out at a temperature of 270-800°C, chloride ion being replaced from hydrochlorides contained in said gaseous hydrocarbons and the resulting chlorine gas being expelled out of the hydrochloride removal portion.

6. The system of claim 1, wherein said cooling portion comprises three stages, through which most of the catalytically cracked gaseous hydrocarbons are converted into liquid hydrocarbons, while certain gaseous hydrocarbons that are non-convertible at room temperature and pressure are colleted and transported back to compensate the heating capacity of the thermal cracking.

7. A system of converting waste plastics into hydrocarbon oil comprising:

(1) a thermal cracking reactor, into which solid waste plastics are fed and in which said waste plastics are cracked at a temperature in a range of 270-800°C to obtain a thermal cracking product resultant of partly gaseous hydrocarbons and partly a mixture of liquid hydrocarbons and residues;

(2) a catalytic cracking reactor being connected to receive the gaseous hydrocarbons and having said gaseous hydrocarbons subject to catalytic cracking with an acid catalyst;

(3) a cooling portion in which the gaseous hydrocarbons after the catalytic cracking are substantially converted into liquid hydrocarbons of smaller molecules and remaining non-convertible gaseous hydrocarbon substances;

(4) a continuous thermal cracking and residual discharging portion being connected to receive the mixture of liquid hydrocarbons and residues from the thermal cracking reactor, in which the liquid hydrocarbons are gradually and fully cracked into gaseous hydrocarbons when passing through the continuous thermal cracking and residual discharge portion, while the dry residues from the previous thermal cracking and new residues generated from the further thermal cracking are discharged at a residual discharge outlet of the continuous thermal cracking and residual discharge portion; and

(5) a hydrochloride removal portion being connected to receive the gaseous hydrocarbons, respectively, from the thermal cracking reactor and from the continuous thermal cracking and residue discharging portion.

8. The system of claim 7, wherein a pressurized activation reaction portion is provided to receive the liquid hydrocarbons from the cooling portion to solidify few amount of sulfur, nitrogen, phosphorus contained in the liquid hydrocarbons so as to obtain purified hydrocarbon oils.

9. The system of claim 7, wherein the thermal cracking and residual discharging portion comprises a plurality of continuous reacting tubes of parallel arrangement, and screw-propelling conveyors mounted inside the tubes, wherein the mixture of the liquid hydrocarbons and residues is pushed forward by said screw conveyors, and passes through the reacting tubes, while the mixture is maintained at a high temperature sufficient to enable complete gasification of the liquid hydrocarbons.

10. The system of claim 7, wherein, in said hydrochloride removal portion, the thermal cracking resultants is in reaction with alkaline substances to replace the chlorine from the hydrochloride contained in the thermal cracking resultants

so as to obtain purified gaseous hydrocarbons, and the hydrochloride removal reaction is carried out at a high temperature in a range of 270-800°C.

11. The system of claim 7, wherein the cooling portion comprises three stages of cooling, whereby the catalytically cracked gaseous hydrocarbons are substantially converted into gaseous hydrocarbons of smaller molecules of eight to twenty carbon atoms.

12. The system of claim 11, wherein said gaseous hydrocarbons become liquid hydrocarbons through said three cooling stages, and few gaseous hydrocarbon substances that are non-convertible at room temperature and pressure are led back to the thermal cracking reactor to compensate the heating supply for the thermal cracking reaction.

~~13~~. A method of converting waste plastics into hydrocarbon oil comprising the following steps of:

(1) feeding solid waste plastics into a thermal cracking reactor;

(2) subjecting said solid waste plastics to thermal cracking at a temperature in a range of 270-800°C to obtain a thermal cracking resultant of partly gaseous hydrocarbons and partly a mixture of liquid hydrocarbons and residues;

(3) passing said gaseous hydrocarbons into a catalytic cracking reactor for catalytic cracking with an acid catalyst;

(4) sending said catalytically cracked gaseous hydrocarbons into a cooling portion to obtain liquid hydrocarbons of smaller molecules; and

(5) said mixture of liquid hydrocarbons and residues from the thermal cracking portion being sent into a continuous thermal cracking and residual discharging portion, in which the liquid hydrocarbons are gradually and fully cracked into gaseous hydrocarbons when passing through the continuous thermal cracking and residual discharge portion, while the dry residues from the previous thermal cracking and new residues generated from the further thermal cracking are discharged at a residual discharging outlet of the continuous thermal cracking and residual discharge portion.

14. The method of claim 13, wherein said gaseous hydrocarbons from the thermal cracking reactor and the continue thermal cracking and residual discharging portion are sent to a hydrochloride removal portion for removing hydrochloride from said gaseous hydrocarbons to obtain chlorine free gaseous hydrocarbons before said catalytic cracking.

15. The method of claim 13, wherein said liquid hydrocarbons obtained from the cooling portion are passed into a pressurized activation reaction portion in which few amount of sulfur, nitrogen, phosphorus contained in the liquid hydrocarbons are solidified so as to obtain purified hydrocarbon oils.

16. The method of claim 13, wherein said continuous thermal cracking in said continuous thermal cracking and residual discharging portion is carried out at a temperature range of 270-800°C.

17. The method of claim 14, wherein said hydrochloride removal reaction is carried out in presence of alkaline metathetic substances at a temperature of 270-800°C.

18. The method of claim 13, wherein said cooling is a three-stage cooling, through which most of the gaseous hydrocarbons are turned into liquid hydrocarbons, and few amount of gaseous substances that are not convertible at room temperature and pressure are led returned back to the thermal cracking reactor to generate additional heating for the thermal cracking.

19. The method of claim 15, further comprising a step of separation of hydrocarbon oils from the pressured activation reactor to obtain further purified hydrocarbon oils by means of a centrifuge.

20. A method of converting waste plastics into hydrocarbon oil comprising the following steps of:

(1) feeding solid waste plastics into a thermal cracking reactor;

(2) subjecting said solid waste plastics to thermal cracking at a temperature

in a range of 270-800°C to obtain a thermal cracking resultant of partly gaseous hydrocarbons and partly a mixture of liquid hydrocarbons and residues;

(3) passing said gaseous hydrocarbons into a catalytic cracking reactor for catalytic cracking with an acid catalyst;

(4) sending said catalytically cracked gaseous hydrocarbons into a cooling portion to obtain liquid hydrocarbons of smaller molecules;

(5) passing said mixture of liquid hydrocarbons and residues into a continuous thermal cracking and residual discharging portion, in which the liquid hydrocarbons are gradually and fully cracked into gaseous hydrocarbons when passing through the continuous thermal cracking and residual discharging portion, while the dry residues from the previous thermal cracking and new residues generated from the further thermal cracking are discharged at a residual discharging outlet of the continuous thermal cracking and residual discharge portion; and

(6) sending said gaseous hydrocarbons from the thermal cracking reactor and from the continuous thermal cracking and residual discharging portion to a hydrochloride removal portion for removing hydrochloride from said gaseous hydrocarbons to obtain chlorine free gaseous hydrocarbons before said catalytic cracking.

21. The method of claim 20, further comprising a step of passing said liquid hydrocarbons from said cooling stage into a pressurized activation reaction portion to have few amount of sulfur, nitrogen, phosphorus contained in the liquid hydrocarbons solidified so as to obtain purified hydrocarbon oils.

22. The method of claim 20, wherein said continuous thermal cracking is carried out in a plurality of continuous reacting tubes of predetermined length parallel arranged at a temperature range of 270-800°C.

23. The method of claim 20, wherein said hydrochloride removal reaction is carried out in presence of alkaline metathetic substances at a temperature range of 270-800°C.

24. The method of claim 20, wherein said catalytically cracked gaseous hydrocarbons are passed through three stages of cooling, such that most of the gaseous hydrocarbons are converted into liquid hydrocarbons of smaller molecules, while certain gaseous hydrocarbons that are not convertible at room temperature and pressure are ~~led back~~ to compensate the heating capacity of thermal cracking.

25. The method of claim 21, wherein the liquid hydrocarbon oils is subject to a separation process by means of a centrifuge.